

REMARKS

Claims 1, 2, 3, 4, 5, 15 and 25 have been cancelled and new claims 44-52 have been added so that claims 6-14, 16-24 and 26-52 are now in the application. Claims 11-14, 21-24 and 31-34 have been withdrawn from consideration. Claims 7-10, 17-20, 27-30 and 35-43 have been allowed. New claims 44-52 read upon Embodiment I elected claims.

Claim 6 was rejected under 35 USC 103(a) as being unpatentable over Sato in view of Gill and Pinarbasi. Claim 6 has been amended to be in independent form and is distinguished over these references by reciting:

"the first and second AP pinned layers having the same magnetic thickness."

An exemplary illustration of this structure is shown in Fig. 10 wherein the first AP pinned layer (AP1) 214 has the same magnetic thickness as the second AP pinned layer (AP2) 216. This is set forth more specifically in Applicant's specification at page 11, lines 1-3 wherein it is stated:

" . . . An aspect of the invention is that the thicknesses and materials of the films 240 and 242 have substantially the same magnetic thickness as the magnetic thickness of the iron layer 214. . . ."

In support of his rejection of claim 6, the Examiner states:

"Regarding claim 6, Gill discloses the first and second AP pinned layers have the same magnetic thickness."

The Applicant respectfully disagrees with the Examiner that Gill discloses his first and second AP pinned layers as having the same magnetic thickness. In reference to Fig. 12, Gill states in column 7, lines 40-51 as follows:

" . . . The first AP pinned layer 210 may be exchange coupled to an antiferromagnetic layer 214 via an interlayer 216. With this arrangement the magnetic moment of the first AP pinned layer 210 is pinned perpendicular to the ABS, such as away from the ABS as shown at 218, and the second AP pinned layer 212 is pinned antiparallel thereto, as shown at 220. The first and second AP pinned layers 210 and 212 are preferably cobalt iron (CoFe). It has been found that an interlayer 216 of nickel iron (NiFe) improves the texture of the cobalt iron (CoFe) material of the first AP pinned layer 210 when it is constructed on a nickel oxide (NiO)AFM layer 214."

It should be noted from Gill that the nickel iron(NiFe) interlayer 216, which interfaces the first AP pinned layer (AP1) 210, is a magnetic layer which must be added to the layer 210 in order to determine the magnetic thickness of the first AP pinned layer. Accordingly, the magnetic thickness of the first AP pinned layer is 24Å of cobalt iron (CoFe) and 10Å of nickel iron (NiFe). This is a greater magnetic thickness than the 24Å of cobalt iron (CoFe) for the second AP pinned layer (AP2) 212. Accordingly, the Gill patent does not teach the first and second AP pinned layers (AP1) and (AP2) as having the same magnetic thickness. Accordingly, claim 6 is clearly distinguished over the Gill patent. Further, it should be noted that neither Gill or Pinarbasi teach that their AP pinned layers are self-pinned. It should be noted from Fig. 12 that Gill's AP pinned layer is pinned by a pinning layer of nickel oxide (NiO) 214. This is discussed in the above quote from Gill. The same is true of Pinarbasi. Note the AFM pinning layer of platinum manganese (PtMn) 214 in all of Pinarbasi's embodiments. Regarding the importance of the magnetostrictive anisotropy of one the AP pinned layers, the Examiner's attention is respectfully invited to page 5, lines 11-15 of the specification wherein it is stated:

" . . . Accordingly, the higher magnetostrictive anisotropy in one of the AP pinned layers self-pins the AP pinned layer structure without the necessity of a pinning layer and the elimination of the pinning layer increases conduction of hot electrons between the emitter and the collector through the base."

Claim 44, which is dependent upon claim 6, is further distinguished over the references by reciting:

" . . . wherein at least one of the AP pinned layers is $Co_{50}Fe_{50}$."

This aspect of Applicant's invention is discussed on page 12, lines 22 and 23 wherein it is stated:

" . . . Further, an aspect of the invention is to employ a cobalt iron with a high magnetostriction, such as $Co_{50}Fe_{50}$"

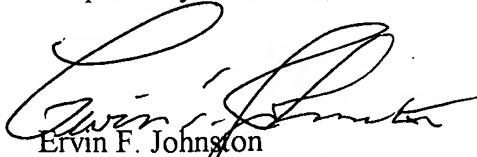
The Applicant maintains that claim 44 is clearly distinguished over the references since none of them teach or suggest employing cobalt iron ($Co_{50}Fe_{50}$) which has a high magnetostriction which is implemented for self-pinning the AP pinned layer of Applicant's invention. Claims 45 and 46, which are dependent upon claim 44, are considered to be patentable over the references for the same reasons as given in support for claim 44.

Claim 16 was rejected under 35 USC 103(a) as being unpatentable over Gill in view of Sato. Claim 16 has been amended to stand in independent form and is considered to be patentable over these references for the same reasons as given in support for claim 6. New claims 47-49, which are dependent upon claim 16, are considered to be further patentable over the references for the same reasons as given in support for claims 44-46 hereinabove.

Claim 26 was rejected under 35 USC 103(a) as being unpatentable over Gill in view of Sato. Claim 26, which has been amended to stand in independent form, is considered to be patentable over these references for the same reasons as given in support for claim 6. Claims 50-52, which are dependent upon claim 26, are considered to be further patentable over the references for the same reasons as given in support for claims 44-46 hereinabove.

The Examiner is respectfully requested to contact the undersigned should there be any questions regarding this Amendment.

Respectfully submitted,



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